

# Rice Husk Waste Exploration: From Nothing into Something Valuable

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## ABSTRACT

Indonesia is one of the largest agrarian countries. A lot of rice fields can be found here and it produces more yields every year include the abundant agricultural wastes. One of the waste is Rice Husk, it is a convex-shaped and golden-yellowish colored when the paddy is ready to be harvested. Some people only use this waste as a farming media although there are lots of ways to make better use of this waste; chemically or by using it to be material of ready-to-wear products like jewelry. Advanced rice husk exploration is conducted in this research as the early treatment of the materials before the rice husk is designed into some valuable accessories. It comes from nothing into something valuable. The method used in this exploration and designing is mainly using experiment approachment method and the result of this exploration will be mainly applied to jewelry products in the form of mixed resin and rice husk.

**Keywords:** *Rice husk, Exploration, Resin, Jewelry, Designing, Exploration Result.*

## 1. INTRODUCTION

Indonesia is a republic country that has lots of nature potentials, include its potency in the agricultural sector, in the area of paddy fields, which also become Indonesian's main daily consumption. Paddy fields area is basically a set batch of land plots which cultivated and watered to be a place to plant paddy and another plant such as peanuts, corns, and yams in the dry season. In a year, paddy field can produce up to 2 times harvesting in a period of 134 days each time.

Indonesia has lots of paddy field almost in its every district, although as the time goes by, those paddy fields are eroded by urban buildings. By taking a look at the amount of the paddy fields in Indonesia, we can see that the harvests produced are plentiful and abundant. Along with those abundant harvests, there are also lots of agricultural wastes that being produced. Some of the wastes, such as rice straw and rice husk, which the potential can be developed through the right process.

Rice husk is a material that separated from the inner content during the grinding process and also a good growing media so it's often used by Indonesian in farming. Even so, the existence of rice husk that's too much and accumulated each time, can be another problem for the ecology. The lack of knowledge to process this waste also makes it become more difficult to handle. Therefore, advanced research or exploration needs to be done further, intentionally to seek other potentials that can be developed from rice husk waste, also how far this material can be explored. In this case, the writer did some surveys to two paddy fields, which are located in Sumedang, West Java, and Tabanan, Bali, as a field survey variable because basically, Indonesia's rice fields have many similarities in agricultural products.

Wastes that are not treated properly will cause problems and imbalances in ecological and environmental systems. The environment is essentially a life order [1]. In its own aspect, environmental planning is an attempt to balance and align the various enterprises, which, for one-sided gain, have made various losses to the natural environment itself. Although the company's firms are often designed to perfect each other, chances are likely that conflict and imbalances can arise at any time. On a global scale, some observers fear that human existence for industrial growth can trigger environmental degradation and resource depletion, and the end result will be the destruction of the environment [2].

Rice husk has typical grain color, and pattern of physical form that's easy to proceed so from the visual aspect, the processed form of this material can be done. This waste is also a material that anti-fungi, easily dry, and light although it has strong proportions. In fact, rice husk has same physical characteristics with paddy straw; either in the visual aspect, texture, strength, and its constituent components. As the material that arranges product, rice husk can be easily regenerated and easy to be formed because of its small dimension. Nevertheless, with this huge visual potency, so far, the utilization of this waste and other agricultural wastes only limited around the horticultural field, fuel, or isolating material. There are also several parties that use rice husk waste as the mixed material for particle board and building material as well, to replace concrete or woods. Therefore, an advanced process from visual aspect is a big potency that can be developed and become livelihood to Indonesian, especially the ones who live around paddy fields.

## **2. METHOD**

Research methodology that used in finishing the data collecting Is qualitative method, which is a methodology research that used to investigate, to find, to illustrate, and to explain the quality or privilege from social influences that cant described, measured or illustrated through quantitative approach method [3]. The method is done by directly observing and reviewing the circumstances in the field, also the related material's state and the thing that might able to support the production of jewelry designing based on rice husk waste. This method is also a data collecting method and systematically recording towards the object or region under study, which intersects with the material of experiment that is being done.

- A. Interview and discussion are done verbally with the residents around the region. Data that collected from this method involve the harvest potencies, especially rice husk waste, and the situation around paddy fields generally based on the residents' point of view.

- B. Observation is a data collecting method by observing directly and systematically recording towards the object that is being observed. Observation is done by the researcher by doing the things above about the jewelry that is sold in the markets, agricultural resource and aspects that can be developed.
- C. Literature Study will be used to fulfill the data completeness by doing such as the using of theoretical book of visual study and the previous exploration that has been done related to rice husk as the material that will be explored, books about jewelry, literatures about agricultural potencies, journals that have relation with the topic mentioned in either exploration or designing process.
- D. The method that used in this exploration, research and designing is an experimental method. The experimental method is a method that allows researchers to manipulate the variables and researching the effects. In this method, the variables are being controlled in such way, so the external variables that may influence might be erased. This method is used purposely to seek causality by manipulating one or more variables in an experimental group and comparing the result with another experiment with the different variable that treated differently, which by doing [4];
- a. Identifying perspectives from related subjects and variables
  - b. Improving the number of experimental variables so the result of the experiments will be more objective
  - c. Adapting experimental models that already been done before and adding another treatment and alteration that support the related experiment.

Exploration or experimentation is an experiment that uses certain factors and procedures. Factors that have been known to its properties to produce a certain effect or effect, so that with known and mastered the properties of these factors, the procedure can be repeated by producing the same effect [5]. The exploration and create valuable ideas sometimes occur by the Divergent and Convergent Thinking as it is consciously or unconsciously happened [6][7].

In the research process with qualitative methodology, validation that will influence data's validity and research methodologies are needed. The data validation method is with triangulation in the related qualitative research. In accordance with the methodologies that had been done, there are some research methodologies concentrations which take an important role in either data collecting or method that will be explored and designed material; which are observation, literature study, and experimental approach.

Observation is basically done by doing the treatments directly towards the research objects and other objects that have relation with the related research material. Observation is a benchmark between field's circumstance and existed literature, also limitation from the experiments being done.

While in the literature study part, which is the information media and data validity of everything related to the research, exploration, and design process. Including literature data about the explorations done before. In experimental approach, the exploration is being done on particular variables by modifying previous explorations or experiments.

### **3. RESULT AND DISCUSSION**

#### **3.1. Result**

Rice husk exploration process is a process that's suggested to use supporting materials be in the form of chemicals or synthetic material [8][9]; either as preservatives or another needed material. This process tend to only spend short period of time, but needs more time in drying process of the wet rice husk, because instant drying process such as roasting can change the color of rice husk itself.

Too much treatment or advanced exploration can also give an unnatural impact in product making based on rice husk as its main material[10]. Rice husk itself has its own natural color, which won't be mixed really well if the researcher add too much artificial colorings material, and also, because of its small dimension, rice husk can be easily explored. It's just, the pointed tip that rice husk has should be treated more so it won't protrude and harm the jewelry user.

#### **3.2. Discussion**

The final conclusion of this exploration is that the ideal experiment which can be applied in the new material making based on rice husk waste is an exploration that uses another compactor material so the rice husk itself can be formed by the applied medium. Other consideration, rice husk is a small material and another medium is needed to be forming medium so the rice husk can be one intact material. Referring to the color that produced, rice husk needs two compact materials with different form; intact rice husk and powder rice husk. Therefore, a compact material in liquid form is also needed, so the empty gaps between the husks can be filled. Aside from its clear color and it can make the husk being clearly seen, Resin is a strong mixing material and can prevent decomposition of rice husk.

Rice husks have been through various experiments or explorations to see how far this material can be utilized so that the amount of waste milling can be reduced. Some of the results and processing that has been done include[11]:

1. Using the grinding method to convert rice husk as raw material of glue. This process is done until rice husk becomes fine powder.
2. Using the method of combustion, crushing and mixing with adhesive materials so that rice husk can be a simple fuel, or bio charcoal briquettes. This is because rice husk has enough heat to make it fuel.
3. Processing with combustion method to make Zeolite. Zeolite is one of the minerals that has the properties of water softening and is the main material that can be utilized in various kinds of chemical processes.
4. There is also an exploration of grain husks conducted by one of the building material manufacturers in the United States, namely Kirei. This company is engaged in materials that are environmentally friendly and derived from nature. The exploration is done using wheat husk which is then processed and formed into a wheat board. This material itself is already used in some buildings.

According to Kireicompany itself, the existence of wheat board can be a solution for the above problems. Wheat board production process is also processed with a machine and do not use too many work tools [11].

Referring to rice husk's characteristic itself, then it's an innovating and right thing to make it a new material for jewelry making. Proper exploration and utilization precisely will make rice husk a material that can be a unique characteristic to the products made from it, at last. In rice husk exploration, there are also restrictions as mentioned above, i.e. the utilization of original material and additional material percentage 80: 20 so the originality of rice husk itself remain assured.

The final exploration that used is to mix the powder rice husk and intact one with resin then form the mixture to some shapes. This last exploration is used because of its safest texture to be used as jewelry's constituent material. The final color also still looks natural and accentuates the physical potency of rice husk itself. The production is also not really difficult neither costing too much.

This new material resulted from rice husk exploration is physically hard and compact. Although there are some cavities, the shape and dimension of those cavities tend to be small, so the structure is still strong. This material is also waterproof and not easily broken. The final shape will be geometrically shaped; based on the silicone mold which is also geometric. The final dimension won't be more than 10 cm, because jewelry products which tend to be small so it won't be too heavy when it is worn. The final color that will be applied to the product will be rice husk's natural color; i.e. yellowish, gold with a bit brown tone. The texture that will be appeared in the final result is a smooth and slick texture, by not showing the rice husk's original shape to prevent the harms towards user caused by its pointed tip. The material resulted from the exploration intended for jewelry product making; which can be used for daily fashion support and can be freely used by female users anytime.

The final product, later, will be able to be worn in either indoor or outdoor, urban area or rural, formal environment such as in the workplace or non-formal one such as family gathering or else.



**Picture 3.** Final Exploration Results (Source: Writer's Document, 2018)

#### 4. CONCLUSION

Research and design that has been done result a problem research by mixing rice husk that has been through basic processing with resin to make it a compact material. The final result is jewelry product based on the concept that was decided by 100 respondents by questionnaire, still showing rice husk's basic characteristics. The utilization of the visual potency is also done by adding supporting material; which uses crochet in this design, based on the questionnaire and the concept that's being applied. Rice husk Is a material that's easy to get, available in a large amount and low cost. The utilization of this material can also decrease the population of rice husk waste, and the production is also easy.

The innovation of this research is expected to help the community growth in economic and social sectors [12], with the existence of this jewelry design based on rice husk, the writer hopes that in the future, advanced research and design will also be done so another innovative product can be produced based on this existed material. Products with this material basically have a big chance to be sold because it can be low cost and innovative. However, lack of advanced jewelry design's development is another obstacle, as well as people's interest that intends to buy jewelry made from gold, silver and else so, in the future, the development by making metal as supporting material is needed..

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